PROC. BIOL. SOC. WASH.
103(4), 1990, pp. 913–921

A NEW COMBINATION AND SYNONYMY FOR TWO SUBSPECIES OF *CUCUMARIA FISHERI* WELLS (ECHINODERMATA: HOLOTHUROIDEA)

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Abstract.—*Cucumaria fisheri fisheri* Wells is a junior subjective synonym of *Cucumaria piperata* (Stimpson). *Cucumaria fisheri astigmata* Wells is referred to the genus *Pseudocnus* Panning. The new combination *Pseudocnus astigmatus* (Wells) is redescribed here.

The taxonomy of Cucumariidae from the west coast of North America needs revision. This paper addresses one taxonomic problem as part of a larger study into the systematics of a group of brooding holothuroids, to be reported on later. Wells (1924) described *Cucumaria fisheri* (later in the same paper he referred to it as *C. f.* forma *fisheri*) as yellow with brown spots, and with podia in double rows. *C. f. astigmata* was described as orange yellow, without spots, and having scattered podia. The obvious differences in podia arrangement led me to question whether the two forms were conspecific. In this paper I shall assume "forma" to be equivalent to subspecies (Int. Trust Zool. Nomen., 1985, Section 45(g)).

My examination of the holotypes (Figs. 1, 2) confirmed that the external characters are as Wells originally described. He stated that the ossicles of *C. f. astigmata* were ". . . identical with those of *Cucumaria fisheri,* forma *fisheri*" (Wells, 1924:118). I sampled skin ossicles from the holotypes and found them to be substantially different. Skin ossicles from the holotype of *C. f. astigmata* (USNM E01196) are thick, knobbed, perforated buttons or plates (Fig. 3). A few are pine-cone shaped with a spiny handle-like extension at one end. They appear to match the ossicles illustrated by Wells (1924, fig. 1). Ossicles from the holotype of *C. f. fisheri* Wells (USNM E01198) are, on the other hand, relatively thin, perforated plates with serrated edges. Most are oval with a handle-like extension and pointed bumps on both surfaces (Fig. 4). The ossicles from these two forms are undoubtedly from distinct species rather than from two conspecifics as suggested by Wells.

The holotype of *C. fisheri fisheri* should be referred to *Cucumaria piperata* (Stimpson, 1864). *Cucumaria piperata* was described from specimens collected in Puget Sound. Unfortunately, the type specimen has been lost. There is little doubt, however, that Stimpson was describing the white, speckled sea cucumber commonly found in the sheltered waters of Washington and British Columbia (Fig. 5). Deichmann (1937: 169) confused the identification of this species by referring a specimen from off San Jose Point, west of Lower California, to *C. piperata* (Stimpson); however, that specimen had ". . . knobbed perforated plates with dentate handle and small four-holed swollen or knobbed buttons." *C. piperata* does not have the latter "four-holed . . . buttons." Deichmann probably had either *C. californica* Semper or *C. f. astigmata.* Panning (1962) illustrated the ossicles of *C. piperata* for the first time, and also stated that the four-holed plates, mentioned by Deichmann, were absent.

As a result of this confusion in the literature, the identification of white, spotted sea cucumbers on the west coast of North America has been unclear. I have collected

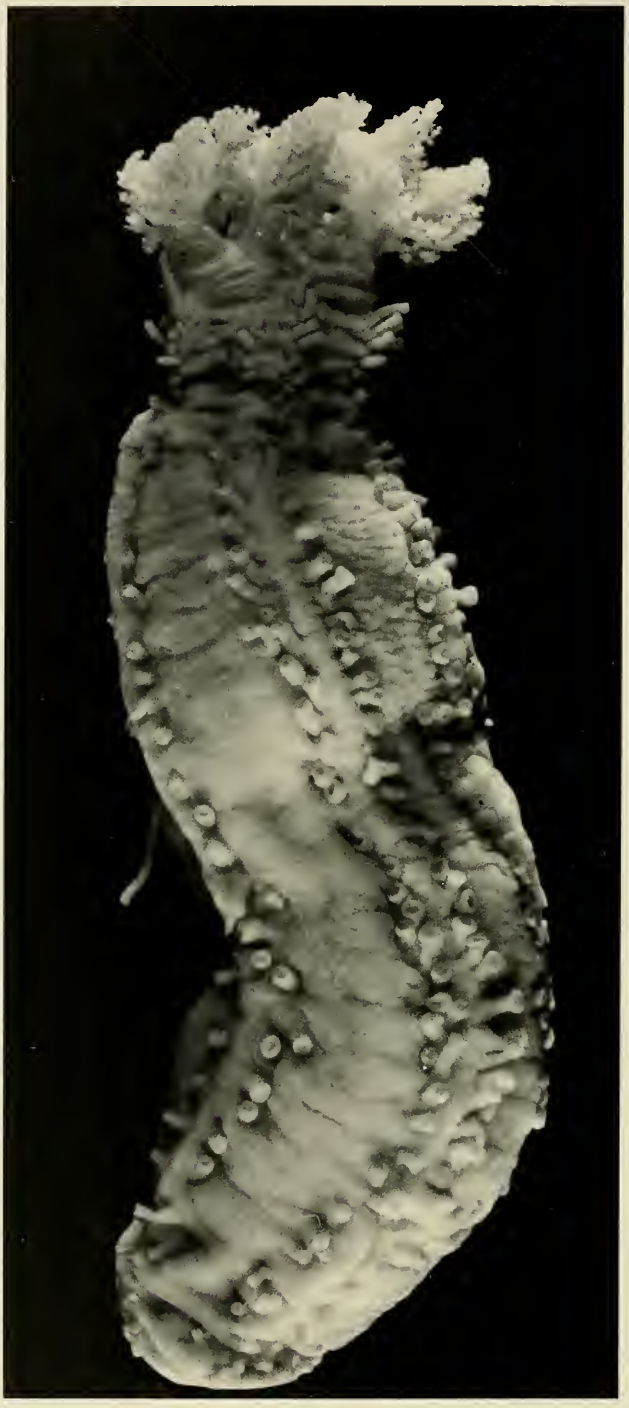


Fig. 1. Holotype of *Cucumaria fisheri fisheri* Wells (USNM E01198); length 41 mm.

plain white and spotted individuals with ossicles that match those described for *C. f. astigmata* (Fig. 6). It appears that Wells combined the external features of *C. piperata* and the ossicles of the spotted form of *C. f. astigmata* in describing *C. f. fisheri.*

Based on my re-examination of the two holotypes, I consider *C. f. fisheri* Wells, 1924 to be a junior subjective synonym of *C. piperata* (Stimpson). The subspecies *astigmata* should be raised to species status as *Cucumaria astigmata* Wells.

In his revision of the Family Cucumariidae, Panning (1949) placed *fisheri* Wells and *fisheri* forma *astigmata* Wells in the genus *Stereoderma.* He also placed *piperata* (Stimpson) into *Pseudocnus.* In two later papers (Panning 1962, 1964) he reversed his decision, returned *piperata* to *Cucumaria,* and then removed *fisheri* from *Stereoderma.* Panning (1962:58) also redefined the ossicles of *Pseudocnus.* His description translates from German as "plates in the shape of pine cones, tightly layered. Below those, more deeply within the skin, round plates can be found." *C. astigmata* has pinecone ossicles in variable numbers usually clustered around the bases of the podia, and numerous thick buttons; thus, I believe *astigmata* should be placed in the genus *Pseudocnus.*

Genus *Pseudocnus* Panning, 1949
Pseudocnus astigmatus (Wells, 1924)
(Figs. 2, 3, 6)

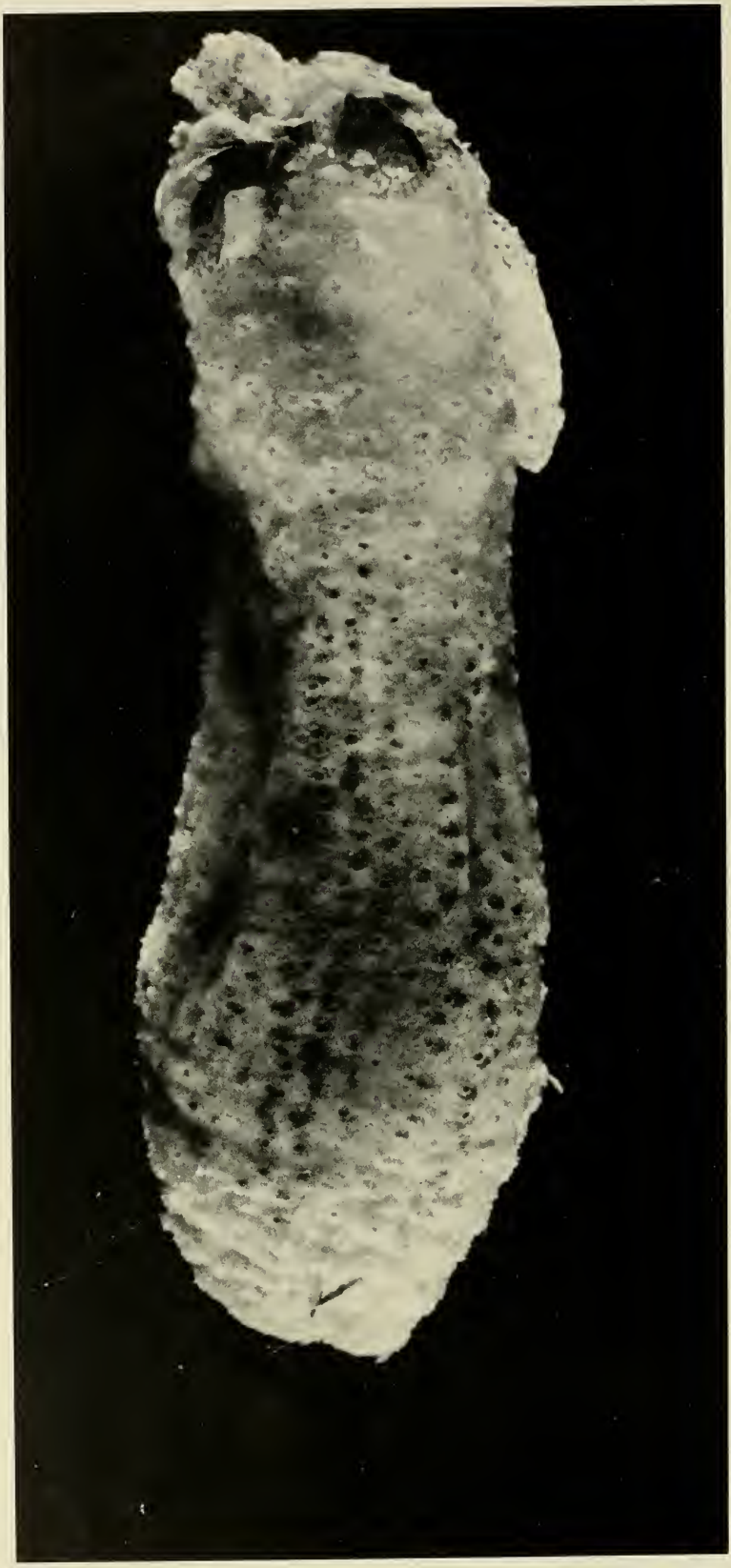
Cucumaria fisheri forma *astigmata* Wells, 1924:117, fig. 2.
Stereoderma fisheri forma *astigmata* Panning, 1949:422.
Stereoderma fisheri Cherbonnier, 1951:42, plates 11 and 12.

Material examined.—Collections by P. Lambert unless otherwise indicated. Ossicles were examined from 1 to 5 specimens in each lot.

California: Holotype USNM E01196, length 33 mm, H. Wells, 1923, off Monterey and Cabrillo Point, Pacific Grove, depth 22 m; CASIZ 021555, 2 specimens, length 20, 25 mm, 10 May 1904, Albatross Station 4441, Point Pinos, Monterey Bay, depth 51–64 m; CASIZ 15222, 5 specimens, length 20, 14, 22, 20, 8 mm, M. H. Spaulding, Pacific Grove, Monterey Bay, no depth; CASIZ 021554, 3 specimens, length 45, 40, 20 mm, summer 1908, China Point to Del Monte, depth 31 m; CASIZ 1200, 1 specimen, length 8 mm, 8 Apr 1973, Ano Nuevo Cove, San Mateo Co., intertidal.

British Columbia: RBCM 982-237-2, 4 specimens, 30 Sep 1982, Ogden Point, Victoria, Juan de Fuca Strait, 15 m; RBCM 988-751, 32 specimens, 2 Jun 1988, Whiffin Spit, Sooke, Juan de Fuca Strait, low intertidal; RBCM 973-154-5, 5 specimens, 28 Jun 1973, Dicebox I., Barkley Sound, depth 21 m; RBCM 973-183-30, 100 specimens, 25 Jul 1973, Cree Island, Barkley Sound, depth 26 m; RBCM 973-152-32, 2 specimens, 27 Jun 1973, Gilbert Island, Barkley Sound, depth 12 m; RBCM 974-595-2, 2 specimens, D. B. Quayle, 20 Jul 1959, Louie Creek, Esperanza Inlet, intertidal; RBCM 980-343, 1 specimen, 6 Jul 1980, Rugged Point, Kyuquot Sound, depth < 21 m; RBCM 985-384-7, 6 specimens, 1 Jun 1985, Sobry Island, Kyuquot Sound, intertidal; NMC 2221, 2 specimens, R. O'Clair, 29 Jun

Fig. 2. Holotype of *Cucumaria fisheri astigmata* Wells (USNM E01196) herein called *Pseudocnus astigmatus* (Wells); length 33 mm.



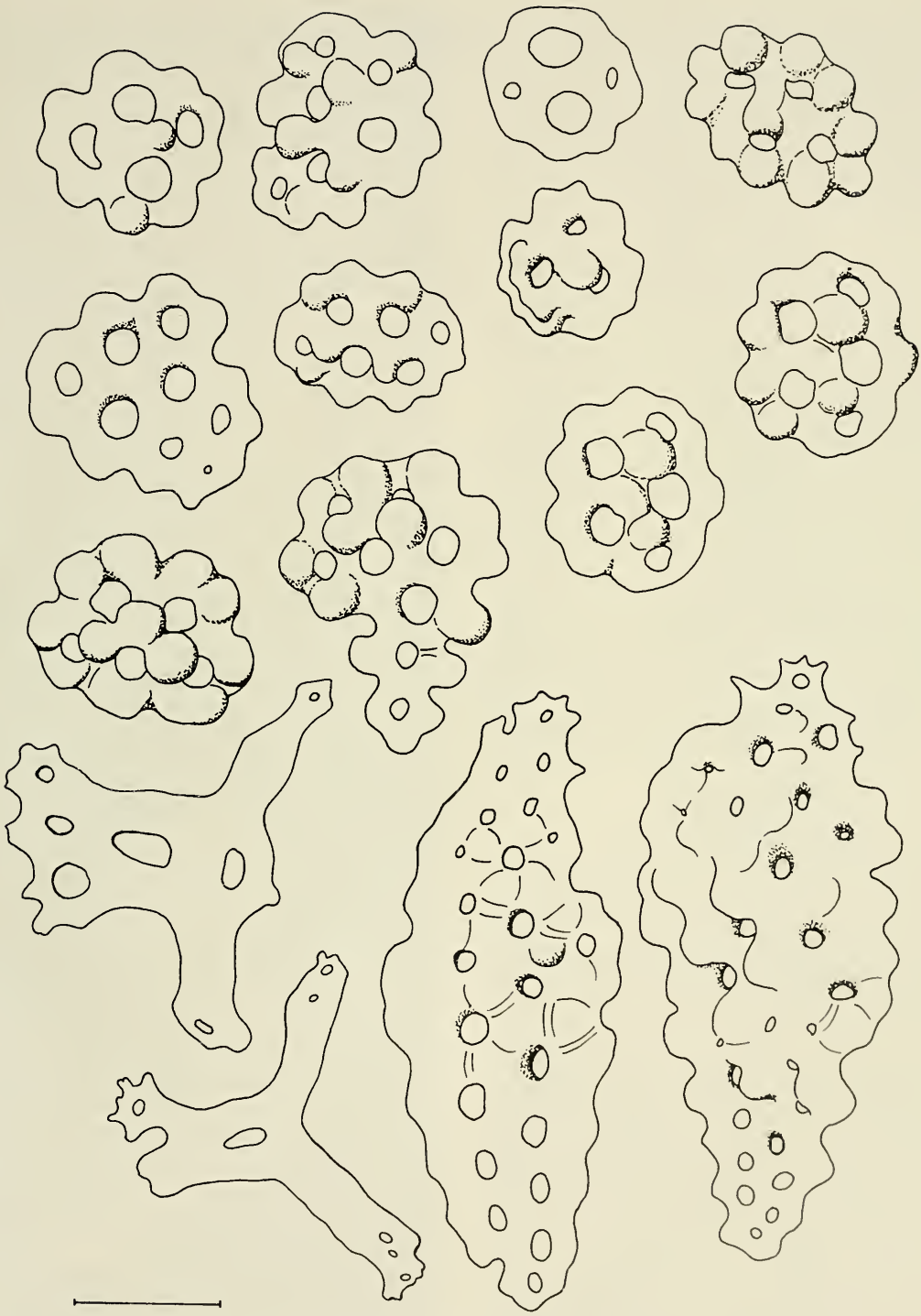


Fig. 3. Ossicles from the mid-dorsal skin of the holotype of *C. f. astigmata* Wells (= *Pseudocnus astigmatus* (Wells)); scale bar = 100 μm.

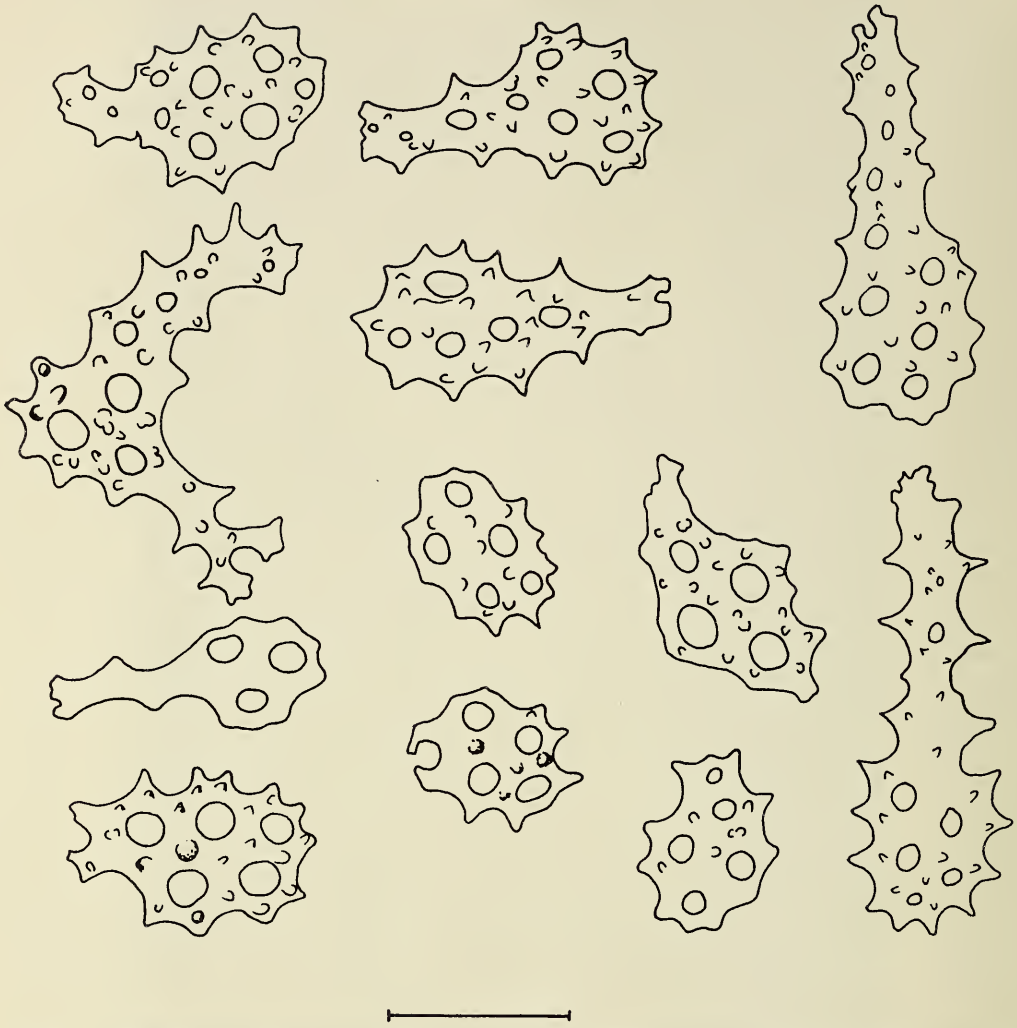


Fig. 4. Ossicles from mid-dorsal skin of the holotype of *C. f. fisheri* Wells (= *Cucumaria piperata* Stimpson); scale bar = 100 μm.

1976, San Josef Bay, Vancouver Island, intertidal; RBCM 980-338, 2 specimens, 1 Jul 1980, Cliffe Point, Quatsino Sound, depth 18 m; RBCM 980-329-7, 3 specimens, 28 Jun 1980, Hunt Islets, Queen Charlotte Strait, depth < 21 m; RBCM 977-444-5, 3 specimens, 12 Jan 1963, D. B. Quayle, FRB 63-2, Cormorant Channel, Queen Charlotte Strait, depth 26 m; RBCM 976-1037-7, 1 specimen, 27 Mar 1976, Juan Perez Sound, Queen Charlotte Islands, depth < 18 m; RBCM 102-19, 1 specimen, 3 Jun 1969, G. C. Carl, Frederick Island, Queen Charlotte Islands, intertidal; RBCM 108-18, 7 specimens, 4 Jun 1969, G. C. Carl, Louis Point, Graham Island, Queen Charlotte Islands, intertidal; RBCM 984-219-1, 1 specimen, 29 Apr 1961, D. B. Quayle, FRB S-4 H-9.7, Langara Island, Dixon Entrance, depth 82 m.

Diagnosis.—Small form with robust ventral podia in rows as well as between the ambulacra. Dorsal podia visible as scattered dimples. Ten tentacles of equal size. Cal-

careous ring without posterior prolongations. Majority of ossicles are knobbed buttons with from 4 to 10 perforations, some with a spiny, handle-like extension and more than 20 perforations; three-armed supporting rods in podia. Color varies from yellowish-white to white with fine brown spots primarily on the dorsum and ends of animal.

Holotype.—USNM E01196.

Type locality.—Monterey, California, 22 m.

Range.—British Columbia to California; intertidal to 82 m.

Remarks.—*Pseudocnus astigmatus* (Wells) appears to be closely related to *Cucumaria curata* Cowles and *Cucumaria lubrica* Clark. Like these latter two species, *P. astigmatus,* collected at Whiffin Spit, Juan de Fuca Strait, brood large yolky eggs and juveniles between the ventral surface and the substrate. *P. astigmatus* also has similar tentacles, podia, body shape and has certain ossicle shapes in common with *C. curata* and *C. lubrica.* Further studies are planned to investigate the systematics of these closely related forms.

Acknowledgments

I wish to thank Dave Pawson, National Museum of Natural History (USNM); Ailsa Clark, British Museum (BM); Peter Frank, Canadian Museum of Nature (CMN) (formally National Museums of Canada (NMC); and Elizabeth Kools, California Academy of Sciences (CASIZ), for loan of specimens. Translations of relevant German papers were kindly provided by Dave Pawson, Mary Bergen and Maria Abbott. I especially thank my colleagues Alex Peden and Rob Cannings for their constructive suggestions to improve the manuscript and to Rich Mooi

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Fig. 5. *Cucumaria piperata* (Stimpson) collected from Nasparti Inlet, west coast Vancouver Island; depth 12 m; length 71 mm (RBCM 985-409-3).

and an anonymous reviewer for their useful comments. Thank you also to Barbara Kuluah for typing it. Funding was provided by the Royal British Columbia Museum (RBCM) and the Friends of the Royal B.C. Museum.

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Fig. 6. Plain and spotted forms of *Pseudocnus astigmatus* (Wells) (= *C. f. astigmata* Wells) collected at Whiffin Spit, Sooke, British Columbia; low intertidal amongst holdfasts of *Hedophyllum*; length of spotted specimen, 42 mm; plain specimen, 37 mm (RBCM 988-751).